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ABSTRACT

An examination of mean scores for two samples of 884 and 1570 high school students who were administered the National Merit Scholarship Qualification Test (NMSQT) in 1962 and for the entire population of 794,589 students given the same test in 1965 revealed consistent effects of birth order on mean score. Earlyborn, and firstborn in particular, scored higher within constant family sizes. Covariance of mother education, father education, family income, and mother age failed to alter the relationship. A step-down analysis of the five NMSQT tests (English Usage, Math Usage, Social Studies Reading, Natural Sciences Reading, and Word Usage) suggested that a verbal component represents the primary source of the birth order effect. Sibling spacing and sex were also considered. Closely following siblings, whether male or female, tended to score lower. The number of like-sexed siblings in a family, however, appeared not to affect any of the test scores appreciably. Comparison of the results of this study with the results of studies of twins and studies of family size effects leads to the possibility that the causes of higher scores for earlyborn and well-spaced siblings but lower scores for laterborn, twins, and closely-spaced siblings may all relate to the degree of isolation from other siblings during the early months of life. (Author/NE)

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Birth Order, Family Configuration, and Verbal Achievement

Hunter M. Breland

Educational Testing Service

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Schooler (1972) recently suggested that most birth order effects reported in the literature are artifacts of either population characteristics or of socioeconomic factors. With respect to the case of birth order effects on verbal achievement, new evidence indicates that such artifacts are not the explanation. Nevertheless, Schooler (1972) has made some cogent remarks about birth order studies. The fluctuations in population characteristics so aptly described by Hare & Price (1969, 1970) and by Price & Hare (1969) no doubt explain many of the birth order "findings" which abound in the literature. Further confusion over birth order effects stems from measurement and analytical deficiencies. The low reliability (and questionable validity) of the measures often used and the failure to provide at times even the most basic of controls leads one to question the value of serious discussion of most birth order research.

Studies of birth order and achievement (or intelligence) test scores, however, represent one area of research in which the measurement problems are much less severe. Even here a thorough search is necessary to locate work involving both adequate data and sophisticated analysis. Recent

analyses of birth order effects (Breland, 1972a, 1972b), using data collected by Nichols (1968, 1973), were conducted with the objectives of: (i) investigating the influence of the population characteristics cited by Price and Hare, (ii) simultaneously controlling family size, socioeconomic status and mother's age, and (iii) isolating the verbal component. The results show a remarkable similarity of patterns to those obtained by both Record, McKeown, & Edwards (1969) and by Eysenck & Cookson (1969). Although Record and his associates speculated that the distinct superiority of early-born observed may be due to some combined effect of social class and mother's age, they performed no analyses to support such a conclusion. The Nichols' data, mentioned often in the literature (e.g., Altus, 1966a, 1966b; Schooler, 1972) involve extensive information on birth order, family size, socioeconomic status, sibling spacing, mother's age, etc., for almost 800,000 National Merit Scholarship participants.

Analyses of the Nichols' data, performed by the method of Bock (1972), show that confounding population factors are indeed at work in sample of individuals born during the post-World War II era. Almost any sample of persons born during this period, select or otherwise, will show more first-born than might be expected. But one of the errors commonly made in birth order studies is that of the so-called equiprobable expected distribution of birth ranks (that half of those from two-child families, one-third of those from three-child families, etc., should be firstborn). In years of high marriage rates, there will obviously be more firstborn. And this is only one of several reasons why expected distributions used in past birth order research have usually been incorrect.

Consequently, a different approach was taken to explore the hypothesis of Price and Hare. Instead of assuming the expected distributions, these were derived from national samples of National Merit participants. These national distributions were compared with distributions in select groups. Such a select sample was created by extracting, from a large group of 687,049 cases tested in 1965, those subjects scoring in approximately the upper 5% (34,009 cases) on the National Merit Scholarship Qualification Test (NMSQT). There were, thus, two samples from the same nominal birth year (1950), one highly select and the other not select at all (except to the degree that National Merit participants are select). A comparison of the birth order distributions of the select and nonselect groups revealed highly significant, as well as consistent differences. Of those in two-child families, 62% were firstborn in the select group but only 57% in the nonselect group. In three-child families, 53% of the select participants vs. 45% of the nonselect participants were firstborn. Similar comparisons results in the four- and five-child families. The same pattern of results was obtained for 1570 high-scoring participants of 1962 (birth year, nominally, 1947).

These analyses of distributions provide a fairly convincing demonstration that the population biases described by Price and Hare, while evident in the samples, are not the causes of birth order differences in NMSQT scores. They do not preclude, however, the possibility that socioeconomic factors, acting <u>in conjunction</u> with population phenomena cause earlyborn to appear more often in high-scoring groups. To investigate this question, data from the 1962 NMSQT administration, including indices of father's

education, mother's education, family income, and mother's age, were entered in an analysis of covariance. As Schooler has suggested, the socioeconomic variables do tend to favor the earlyborn and those of smaller families. But such a casual observation of possible confounding relationships is misleading. The analysis of covariance indicated that none of the covariates, acting independently or in combination, substantially altered the relationships. Essentially the same results were obtained when a group of very high scoring participants (not included in the original analysis of covariance) were analyzed by an identical procedure, despite the problem of restricted range in the test scores. As a check on the vicissitudes of the analysis of covariance (vide Elashoff, 1969; Evans & Anastasio, 1968; Lord, 1960; Werts & Linn, 1971) blocking in analyses of variance across six levels of mother's education, father's education, and family income yielded the same conclusions.

The results from the large 1965 sample are especially intriguing since means based on such a large sample are stable and consistent. Table 2 shows the 82 siblings configurations into which the sample was divided, together with means and standard deviations on the NMSQT and the number of cases for each (see Table 1 for the description of sibship configuration codes). It is startling to note what happens when these mean NMSQT scores are rank-ordered for males and females separately. In Table 3, one observes that--out of a total of 82 different ways of identifying sibships--precisely the same pattern ranks first for both male and females. The same is the case for ranks 6, 10, 14, 20, 62, 64, and 68. Twins occupy rank 72 for males and rank 70 for females, indicating agreement with most twin research

(that twins usually score low on achievement or intelligence tests). The correlation of the ranks for males and females yielded a rho = .96! That such a high correlation is not due to a family size effects was demonstrated by a rho = .95 within three-child families (Table 5). Rankings for two-child, four-child, and five-child families are shown in Tables 4, 6, and 7 where interesting patterns are notable. When means are combined across birth ranks and sibling configurations, remarkably similar patterns of scores are obtained for both males and females (Figure 1). The importance of spacing is indicated in Figures 2 and 3, for two-child and three-child families, respectively.

Where sibling spacing differences are ignored (to reduce the total number of configurations) as was the case for both four-child and five-child families, the ranking results are even more demonstrative of birth order effects. Of the 20 configurations in four-child families (Table 6), first-born occupy the first four positions, secondborn the next six, thirdborn the following six, and fourthborn the last four positions. And this is true for both males and females. One of the most amazing results occurs for five-child families (Table 7). The first six rank positions are occupied by identical sibling configurations for both males and females!

Since the NMSQT is largely a verbal test, one might suspect that the effects observed are associated with verbal ability differences. The Selection Score is the summation of the five subtests of the NMSQT: Word Usage, English Usage, Mathematics Usage, Social Science Reading, and Natural Science Reading. Step-down analyses of the two samples of data collected in 1962 showed that significant differences on the Word Usage score remained

after the influences of all other test variance was removed. Conversely, a reordering of variables--placing Word Usage early in the step-down sequence--tended to eliminate all other observed effects. No differences were evident for Mathematics Usage scores for any ordering of variables.

These birth order, family size, and spacing effects have an interesting parallel with some twin studies. In an investigation of surviving twins (those whose co-twin died shortly after birth), Record et al. (1970) found that these surving twins had verbal reasoning scores at age 11 very similar to those of singletons. However, normal twins who grew up together to age 11 had verbal reasoning scores significantly below those of singletons, which is a common observation. The parallel is this: for both twins and other sibling configurations, the depressed scores are associated with proximity to other siblings--especially during the early months of life.

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Table 1

Sibship Configuration Codes and Symbols

Code	Symbol	Description
1	X	Only child
2	B-X	Older brother far (3 years or more)
3	BX	Older brother close (2 years or less)
4	S-X	Older sister far
5	SX	Older sister close
6	X-B	Younger brother far
7	XB	Younger brother close
8	X-S	Younger sister far
9	XS	Younger sister close
10	BB-X	Two older brothers far
11	B-BX	Older brother far, older brother close
12	BS-X	Older brother far, older sister far
13	B-SX	Older brother far, older sister close
14	B-X-B	Older brother far, younger brother far
15	B-XB	Older brother far, younger brother close
16	B-X-S	Older brother far, younger sister far
17	B-XS	Older brother far, younger sister close
18	BBX	Two older brothers close
19	S-BX	Older sister far, older brother close
20	BSX	Older brother close, older sister close
21	BX-B	Older brother close, younger brother far
22	BXB	Older brother close, younger brother close
23	BX-S	Older brother close, younger sister far
24	BXS	Older brother close, younger sister close
25	SS-X	Two older sisters far
26	S-SX	Older sister far, older sister close
27	S-X-B	Older sister far, younger brother far
28	S-XB	Older sister far, younger brother close
29	S-X-S	Older sister far, younger sister far
30	S-XS	Older sister far, younger sister close
31	SSX	Two older sisters close
32	SX-B	Older sister close, younger brother far
33	SXB	Older sister close, younger brother close
34	SX-S	Older sister close, younger sister far
35	SXS	Older sister close, younger sister close
36	X-BB	Two younger brothers far
37	XB-B	Younger brother close, younger brother far
38	X-BS	Younger brother far, younger sister far
39	XS-B	Younger sister close, younger brother far
40	XBB	Two younger brothers close
41	XB-S	Younger brother close, younger sister far
42	XBS	Younger brother close, younger sister close
43	X-SS	Two younger sisters far
44	XS-S	Younger sister close, younger sister far
45	XSS	Two younger sisters close

Table 1 (continued)

Code	Symbol	Description
46	BBB,X	Three older brothers
47	SSS,X	Three older sisters
48	X,BBB	Three younger brothers
49	X,SSS	Three younger sisters
50	BBS,X	Two older brothers, one older sister
51	BB,X,B	Two older brothers, one younger brother
52	BB,X,S	Two older brothers, one younger sister
53	BSS,X	One older brother, two older sisters
54	SS,X,B	Two older sisters, one younger brother
55	SS,X,S	Two older sisters, one younger sister
56	B,X,BB	One older brother, two younger brothers
57	S,X,BB	One older sister, two younger brothers
58	X,BBS	Two younger brothers, one younger sister
59	B,X,SS	Older brother, two younger sisters
60	S,X,SS	Older sister, two younger sisters
61	X,BSS	Younger brother, two younger sisters
62	S,X,BS	Older sister, younger brother and sister
63	B,X,BS	Older brother, younger brother and sister
64	BS,X,S	Older brother and sister, younger sister
65	BS,X,B	Older brother and sister, younger brother
66	BBBB,X	Four older brothers
67	BBB,X,B	Three older brothers, younger brother
68	BB,X,BB	Two older brothers, two younger brothers
69	B,X,BBB	Older brother, three younger brothers
70	X,BBBB	Four younger brothers
71	SSSS,X	Four older sisters
72	SSS,X,S	Three older sisters, younger sister
73	SS,X,SS	Two older sisters, two younger sisters
74	S,X,SSS	Older sister, three younger sisters
75	X,SSSS	Four younger sisters
76	OOOO,X	Four older siblings
77	OOO,X,Y	Three older siblings, younger sibling
78	OO,X,YY	Two older siblings, two younger siblings
79	O,X,YYY	Older sibling, three younger siblings
80	X,YYYY	Four younger siblings
81	(5+Sibs)	More than five children in family
82	(Twin)	Twin

Table 2

Mean Selection Scores, Standard Deviations,

and Number of Cases

CODE	SIBSHIP	MALES MEAN	MALES S.D.	MALES CASES	FEMALES MEAN	FEMALES S.D.	FEMALES CASES
1	X	104.48	21.77	38650	103.65	21.18	39403
2	B-X	105.99	20.97	14315	104.00	19.93	16351
3	BX	105.28	21.37	7314	101.83	20.96	8877
4	S-X	105.77	20.63	15720	104.23	20.04	13831
5	SX	104.38	21.06	8132	102.38	20.80	7357
6	X-B	107.34	20.68	19839	105.18	20.06	21572
7	XB	107.54	21.39	9657	104.72	21.02	10591
8	X-S	107.10	20.79	21589	105.30	20.11	18611
9	XS	107.34	21.57	10782	104.88	21.18	8860
10	BB-X	104.65	20.99	3659	102.95	20.18	4452
11	B-BX	101.93	20.97	2385	99.57	20.45	2402
12	BS-X	104.38	21.22	6689	102.77	20.06	6945
13	B-SX	103.80	21.80	1386	100.57	20.77	1512
14	B-X-B	105.27	20.60	3070	103.07	20.24	2784
15	B-XB	103.73	21.43	1045	102.19	20.82	936
16	B-X-S	105.59	20.77	3004	103.62	19.94	2753
17	B-XS	105.53	21.50	1046	104.21	20.41	1008
18	BBX	97.34	22.13	193	96.48	22.79	215
19	S-BX	103.63	21.34	1494	99.94	20.72	1491
20	BSX	97.56	21.79	296	95.49	20.32	269
21	BX-B	106.32	21.03	2664	103.10	20.37	2887
22	BXB	104.90	21.29	1250	100.91	21.64	1428
23	BX-S	106.10	20.85	2928	103.39	19.95	2810
24	BXS	103.85	21.22	1338	100.48	21.36	1252
25	SS-X	104.94	20.63	3795	102.86	20.01	3617
26	S-SX	101.88	21.04	2121	99.97	20.76	1787
27	S-X-B	105.12	20.88	2836	103.66	20.01	3051
28	S-XB	104.30	21.47	973	102.34	21.32	1063
29	S-X-S	104.74	20.42	2812	103.30	19.94	2688
30	S-XS	105.22	21.10	900	103.05	20.50	922
31	SSX	97.32	19.26	190	96.33	22.06	186
32	SX-B	105.01	20.24	2620	102.68	20.60	2931
33	SXB	103.31	20.75	1162	100.95	21.70	1304
34	SX-S	105.35	20.60	2359	103.13	20.48	2636
35	SXS	101.46	22.16	1140	100.99	21.77	1251
36	X-BB	107.17	20.50	6085	104.96	19.96	5597
37	XB-B	108.22	21.13	5235	105.14	20.66	5050
38	X-BS	106.77	20.64	11932	105.17	20.17	11377
39	XS-B	107.63	21.05	4844	105.96	20.60	5332
40	XBB	99.19	24.05	513	96.68	23.60	519

(TABLE CONTINUES ON NEXT PAGE)

Table 2

(continued)

CODE/SIBSHIP		MALES MEAN	MALES S.D.	MALES CASES	FEMALES MEAN	FEMALES S.D.	FEMALES CASES
41	XB-S	108.35	21.13	5600	105.97	20.72	4929
42	XBS	102.27	22.59	804	98.63	23.64	722
43	X-SS	106.95	20.65	5311	105.37	19.74	5380
44	XS-S	106.73	21.47	4836	105.84	20.74	4866
45	XSS	101.95	22.43	497	100.56	23.86	396
46	BBB,X	101.44	21.13	1224	99.18	21.24	1314
47	SSS,X	101.40	20.54	1209	98.99	20.71	1049
48	X,BBB	106.51	21.03	3790	104.05	20.68	3370
49	X,SSS	105.54	21.30	3053	104.79	20.93	3263
50	BBS,X	100.83	21.14	2875	98.91	20.23	3162
51	BB,X,B	102.38	22.11	1567	100.26	21.38	1542
52	BB,X,S	102.72	21.30	1593	100.99	21.14	1680
53	BSS,X	101.84	21.73	2919	99.14	21.03	2988
54	SS,X,B	102.34	21.37	1555	100.32	20.90	1584
55	SS,X,S	101.96	21.03	1407	101.13	20.84	1433
56	B,X,BB	104.54	20.64	2407	101.47	20.47	2249
57	S,X,BB	104.09	20.92	2105	102.05	20.77	2424
58	X,BBS	106.85	20.99	9781	104.96	20.74	10023
59	B,X,SS	104.82	20.90	2185	101.68	20.71	2250
60	S,X,SS	103.20	21.34	2091	102.47	20.23	2324
61	X,BSS	106.46	21.07	9191	104.59	20.57	9511
62	S,X,BS	104.10	21.23	4210	102.14	20.55	4703
63	B,X,BS	104.41	21.09	4499	102.06	20.54	4443
64	BS,X,S	103.04	21.38	2504	99.93	21.08	2724
65	BS,X,B	102.48	21.46	2493	100.19	20.89	2606
66	4B,X	97.17	21.46	718	95.90	20.57	542
67	BBB,X,B	98.24	21.29	331	95.86	20.63	341
68	BB,X,BB	102.01	21.38	614	98.68	21.61	487
69	B,X,BBB	102.97	20.59	622	101.33	20.64	624
70	X,4B	104.61	21.41	1191	103.30	21.19	934
71	4S,X	97.75	20.73	506	95.48	20.31	356
72	SSS,X,S	97.67	21.41	300	93.56	21.11	267
73	SS,X,SS	100.19	21.38	438	97.04	21.51	455
74	S,X,SSS	102.54	22.56	513	100.27	20.58	610
75	X,4S	103.08	21.48	872	101.41	21.82	886
76	4O,X	98.31	20.79	2969	95.49	21.10	2836
77	OOO,X,Y	98.79	21.56	3132	97.14	21.32	3451
78	OO,X,YY	100.85	22.19	4724	98.36	21.03	4912
79	O,X,YYY	102.91	21.26	7258	100.58	21.35	7959
80	X,4Y	105.67	21.25	10569	103.56	21.12	10919
81	(5+SIBS)	97.75	22.65	45725	95.10	22.79	48363
82	(TWIN)	98.95	22.30	6461	97.12	21.89	6382

Table 3

Ranking of Selection Scores by

Sibship Configuration

MALES				FEMALES			
RANK	CODE/SIBSHIP		MEAN	RANK	CODE/SIBSHIP		MEAN
1	41	XB-S	108.35	1	41	XB-S	105.97
2	37	XB-B	108.22	2	39	XS-B	105.96
3	39	XS-B	107.63	3	44	XS-S	105.84
4	7	XB	107.54	4	43	X-SS	105.37
5	9	XS	107.34	5	8	X-S	105.30
6	6	X-B	107.34	6	6	X-B	105.18
7	36	X-BB	107.17	7	38	X-BS	105.17
8	8	X-S	107.10	8	37	XB-B	105.14
9	43	X-SS	106.95	9	36	X-BB	104.96
10	58	X,BBS	106.85	10	58	X,BBS	104.96
11	38	X-BS	106.77	11	9	XS	104.88
12	44	XS-S	106.73	12	49	X,SSS	104.79
13	48	X,BBB	106.51	13	7	XB	104.72
14	61	X,BSS	106.46	14	61	X,BSS	104.59
15	21	BX-B	106.12	15	4	S-X	104.23
16	23	BX-S	106.10	16	17	B-XS	104.21
17	2	B-X	105.99	17	48	X,BBB	104.05
18	4	S-X	105.77	18	2	B-X	104.00
19	80	X,4Y	105.67	19	27	S-X-B	103.66
20	16	B-X-S	105.59	20	16	B-X-S	103.62
21	49	X,SSS	105.54	21	80	X,4Y	103.56
22	17	B-XS	105.53	22	23	BX-S	103.39
23	34	SX-S	105.35	23	70	X,4B	103.30
24	3	BX	105.28	24	29	S-X-S	103.30
25	14	B-X-B	105.27	25	34	SX-S	103.13
26	30	S-XS	105.22	26	21	BX-B	103.10
27	27	S-X-B	105.12	27	14	B-X-B	103.07
28	32	SX-B	105.01	28	1	X	103.05
29	25	SS-X	104.94	29	30	S-XS	103.05
30	59	B,X,SS	104.82	30	10	BB-X	102.95
31	29	S-X-S	104.74	31	25	SS-X	102.86
32	10	BB-X	104.65	32	12	BS-X	102.77
33	70	X,4B	104.61	33	32	SX-B	102.68
34	56	B,X,BB	104.54	34	60	S,X,SS	102.47
35	22	BXB	104.50	35	5	SX	102.38
36	1	X	104.48	36	28	S-XB	102.34
37	63	B,X,BS	104.41	37	15	B-XB	102.19
38	5	SX	104.38	38	62	S,X,BS	102.14
39	12	BS-X	104.38	39	63	B,X,BS	102.06
40	28	S-XB	104.30	40	57	S,X,BB	102.05

(TABLE CONTINUES ON NEXT PAGE)

Table 3

(continued)

MALES				FEMALES			
RANK	CODE	SIBSHIP	MEAN	RANK	CODE	SIBSHIP	MEAN
41	62	S,X,BS	104.10	41	3	BX	101.83
42	57	S,X,BB	104.09	42	59	B,X,SS	101.68
43	24	BXS	103.85	43	56	B,X,BB	101.47
44	13	B-SX	103.80	44	75	X,4S	101.41
45	15	B-XB	103.73	45	69	B,X,BBB	101.33
46	19	S-BX	103.63	46	55	SS,X,S	101.13
47	33	SXB	103.31	47	52	BB,X,S	100.99
48	60	S,X,SS	103.20	48	35	SXS	100.99
49	75	X,4S	103.08	49	33	SXB	100.95
50	64	BS,X,S	103.04	50	22	BXB	100.91
51	69	B,X,BBB	102.97	51	79	C,X,YYY	100.58
52	79	O,X,YYY	102.91	52	13	B-SX	100.57
53	52	BB,X,S	102.72	53	45	XSS	100.56
54	74	S,X,SSS	102.54	54	24	BXS	100.48
55	65	BS,X,B	102.48	55	54	SS,X,B	100.32
56	51	BB,X,B	102.38	56	74	S,X,SSS	100.27
57	54	SS,X,B	102.34	57	51	BB,X,B	100.26
58	42	XBS	102.27	58	65	BS,X,B	100.19
59	68	BB,X,BB	102.01	59	26	S-SX	99.97
60	55	SS,X,S	101.96	60	19	S-BX	99.94
61	45	XSS	101.95	61	64	BS,X,S	99.93
62	11	B-BX	101.93	62	11	B-BX	99.57
63	26	S-SX	101.88	63	46	BBB,X	99.18
64	53	BSS,X	101.84	64	53	BSS,X	99.14
65	35	SXS	101.46	65	47	SSS,X	98.99
66	46	BBB,X	101.44	66	50	BBS,X	98.91
67	47	SSS,X	101.40	67	42	XBS	98.63
68	78	OO,X,YY	100.85	68	78	CO,X,YY	98.36
69	50	BBS,X	100.83	69	77	COO,X,Y	97.14
70	73	SS,X,SS	100.19	70	82	(TWIN)	97.12
71	40	XBB	99.19	71	73	SS,X,SS	97.04
72	82	(TWIN)	98.95	72	40	XBB	96.88
73	77	OOO,X,Y	98.79	73	68	BB,X,BB	96.68
74	76	4O,X	98.31	74	18	BBX	96.48
75	67	BBB,X,B	98.24	75	31	SSX	96.33
76	81	(5+SIBS)	97.75	76	66	4B,X	95.90
77	71	4S,X	97.75	77	67	BBB,X,B	95.88
78	72	SSS,X,S	97.67	78	76	4O,X	95.49
79	20	BSX	97.56	79	20	ESX	95.49
80	18	BBX	97.34	80	71	4S,X	95.48
81	31	SSX	97.32	81	81	(5+SIBS)	95.10
82	66	4B,X	97.17	82	72	SSS,X,S	93.56

Table 4

Ranking of Selection Scores

for Two-Child Families

Males			Females		
Rank	Sibship Pattern	Mean Score	Rank	Sibship Pattern	Mean Score
1	XB	107.54	1	X-S	105.30
2	XS	107.34	2	X-B	105.18
3	X-B	107.34	3	XS	104.88
4	X-S	107.10	4	XB	104.72
5	B-X	105.99	5	S-X	104.23
6	S-X	105.77	6	B-X	104.00
7	BX	105.28	7	SX	102.38
8	SX	104.38	8	BX	101.83

Table 5

Ranking of Selection Scores
for Three-Child Families

Males			Females		
Rank[a]	Sibship Pattern	Mean Score	Rank[a]	Sibship Pattern	Mean Score
1	XB-S	108.35	1	XB-S	105.97
2	XB-B	108.22	2	XS-B	105.96
3	XS-B	107.63	3	XS-S	105.84
4	X-BB	107.17	4	X-SS	105.37
5	X-SS	106.95	5	X-BS	105.17
6	X-BS	106.77	6	XB-B	105.14
7	XS-S	106.73	7	X-BB	104.96
8	BX-B	106.12	8	B-XS	104.21
9	BX-S	106.10	9	S-X-B	103.66
10	B-X-S	105.59	10	B-X-S	103.62
11	B-XS	105.53	11	BX-S	103.39
12	SX-S	105.35	12	S-X-S	103.30
13	B-X-B	105.27	13	SX-S	103.13
14	S-XS	105.22	14	BX-B	103.10
15	S-X-B	105.12	15	B-X-B	103.07
16	SX-B	105.01	16	S-XS	103.05
17	SS-X	104.94	17	BB-X	102.95
18	S-X-S	104.74	18	SS-X	102.86
19	BB-X	104.65	19	BS-X	102.77
20	BXB	104.50	20	SX-B	102.68
21	BS-X	104.38	21	S-XB	102.34
22	S-XB	104.30	22	B-XB	102.19
23	BXS	103.85	23	SXS	100.99
24	B-SX	103.80	24	SXB	100.95
25	B-XB	103.73	25	BXB	100.91
26	S-BX	103.63	26	B-SX	100.57
27	SXB	103.31	27	XSS	100.56
28	XBS	102.27	28	BXS	100.48
29	XSS	101.95	29	S-SX	99.97
30	B-BX	101.93	30	S-BX	99.94
31	S-SX	101.88	31	B-BX	99.57
32	SXS	101.46	32	XBS	98.63
33	XBB	99.19	33	XBB	96.88
34	BSX	97.56	34	BBX	96.48
35	BBX	97.34	35	SSX	96.33
36	SSX	97.32	36	BSX	95.49

[a]Rank order correlation between males and females, rho = .95.

Table 6

Ranking of Selection Scores

for Four-Child Families

Males			Females		
Rank	Sibship Pattern	Mean Score	Rank	Sibship Pattern	Mean Score
1	X,BBS	106.85	1	X,BBS	104.96
2	X,BBB	106.51	2	X,SSS	104.79
3	X,BSS	106.46	3	X,BSS	104.59
4	X,SSS	105.54	4	X,BBB	104.05
5	B,X,SS	104.82	5	S,X,SS	102.47
6	B,X,BB	104.54	6	S,X,BS	102.14
7	B,X,BS	104.41	7	B,X,BS	102.06
8	S,X,BS	104.10	8	S,X,BB	102.05
9	S,X,BB	104.09	9	B,X,SS	101.68
10	S,X,SS	103.20	10	B,X,BB	101.47
11	BS,X,S	103.04	11	SS,X,S	101.13
12	BB,X,S	102.72	12	BB,X,S	100.99
13	BS,X,B	102.48	13	SS,X,B	100.32
14	BB,X,B	102.38	14	BB,X,B	100.26
15	SS,X,B	102.34	15	BS,X,B	100.19
16	SS,X,S	101.96	16	BS,X,S	99.93
17	BSS,X	101.84	17	BBB,X	99.18
18	BBB,X	101.44	18	BSS,X	99.14
19	SSS,X	101.40	19	BBS,X	98.91
20	BBS,X	100.83	20	SSS,X	98.88

Table 7

Ranking of Selection Scores

for Five-Child Families

Males			Females		
Rank	Sibship Pattern	Mean Score	Rank	Sibship Pattern	Mean Score
1	X,YYYY	105.67	1	X,YYYY	103.56
2	X,BBBB	104.61	2	X,BBBB	103.30
3	X,SSSS	103.08	3	X,SSSS	101.41
4	B,X,BBB	102.97	4	B,X,BBB	101.33
5	O,X,YYY	102.91	5	O,X,YYY	100.58
6	S,X,SSS	102.54	6	S,X,SSS	100.27
7	BB,X,BB	102.01	7	OO,X,YY	98.36
8	OO,X,YY	100.85	8	OOO,X,Y	97.14
9	SS,X,SS	100.19	9	SS,X,SS	97.04
10	OOO,X,Y	98.79	10	BB,X,BB	96.68
11	OOOO,X	98.31	11	BBBB,X	95.90
12	BBB,X,B	98.24	12	BBB,X,B	95.86
13	SSSS,X	97.75	13	OOOO,X	95.49
14	SSS,X,S	97.67	14	SSSS,X	95.48
15	BBBB,X	97.17	15	SSS,X,S	93.56

Figure 1

Mean Selection Scores by Birth Order

and Sibship Configuration

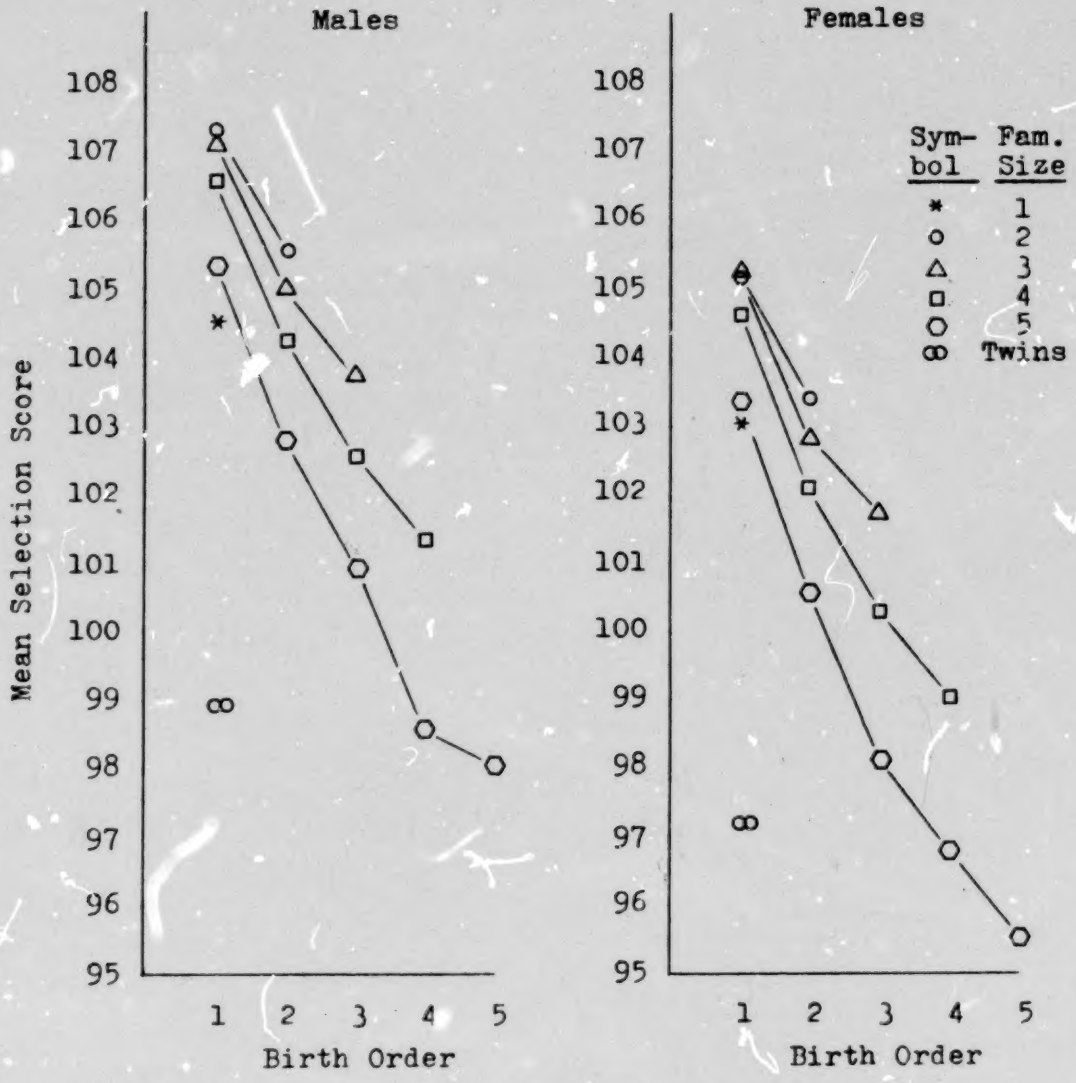

Figure 2

Mean Selection Scores by Birth Order and Sibling Spacing in Two-Child Families

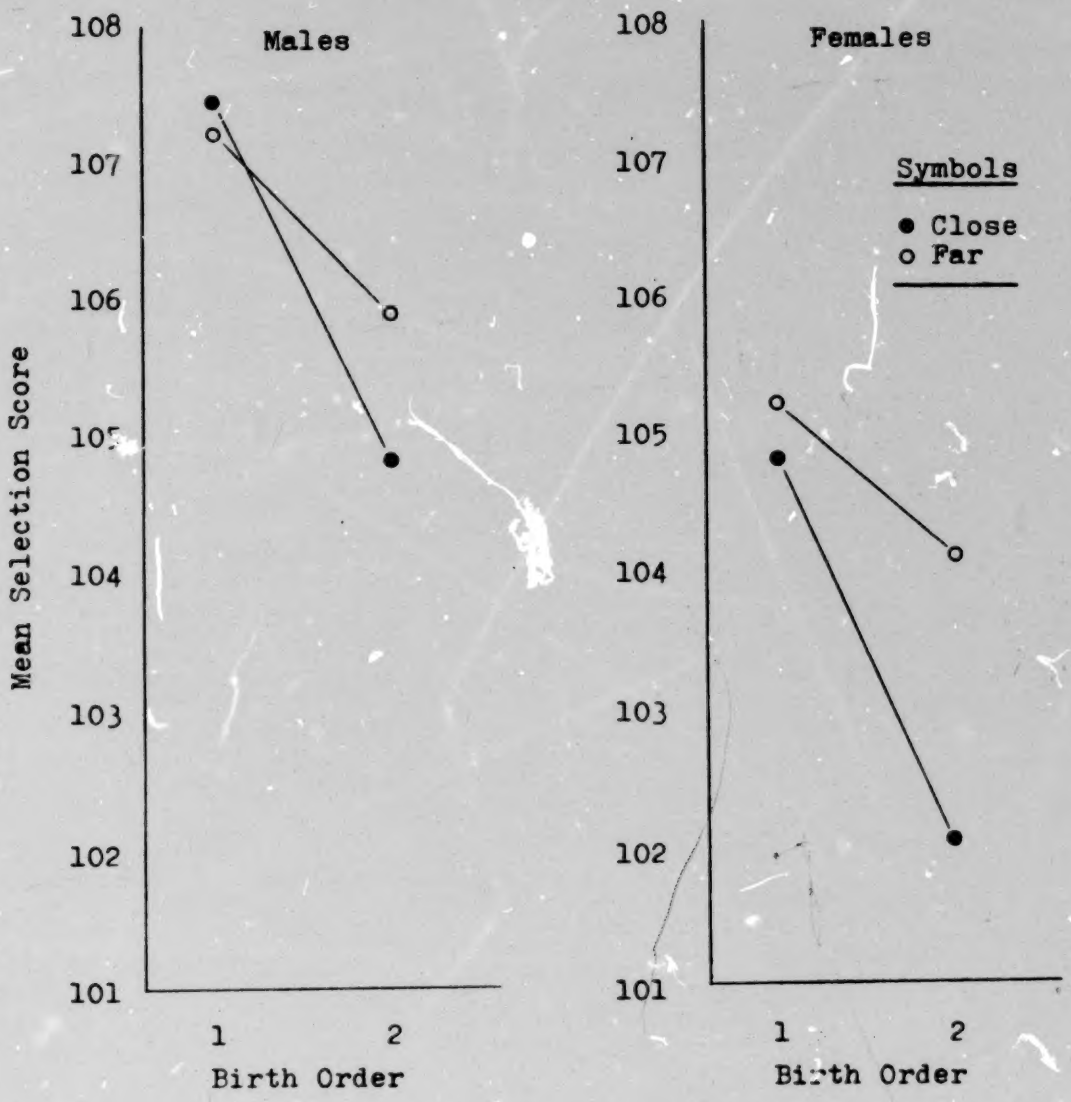

Figure 3

Mean Selection Scores by Birth Order and Sibling Spacing in Three-Child Families